PHYSICOCHEMICAL AND BIOCHEMICAL CHARACTERISATION OF PERAH SEED OR TAPOS

Name of Student
NURDIYANA BINTI HUSIN

Supervisor
IDA IDAYU MUHAMAD, Ph.D

Background of Tapos

Fig. 1: Perah seed tree

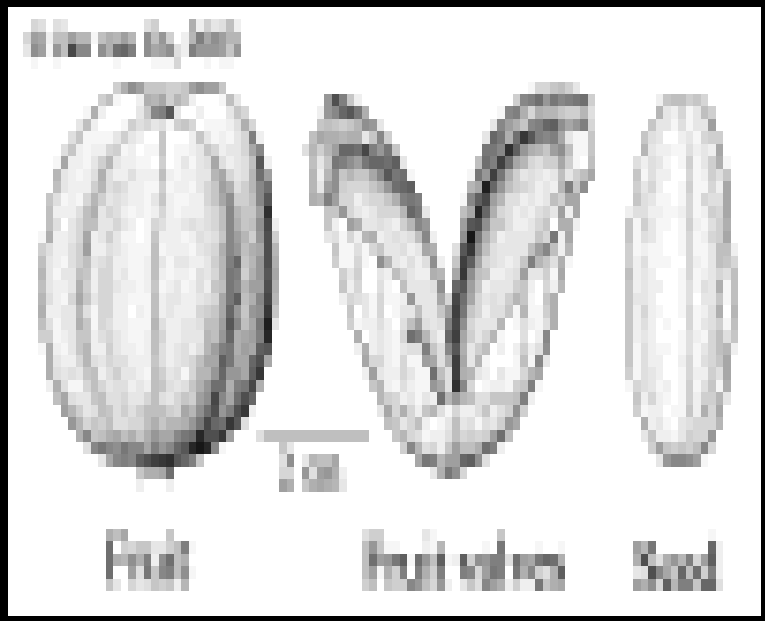


Fig. 2: Perah fruit and seed

Background of Tapos

- *Elateriospermum tapos* is locally known as buah perah or perah tree
- It is found from Southern Thailand to Peninsular Malaysia.
- It is flowering and fruiting throughout the year

Tapos is a new discovery of seeds and the information on its nutritional value and antinutritional value is very lack.

Problem statement

Tapos is an abundance type of seed since it is easily planted and found.

So, the problem is either it has;

Or
- → Nutritional value
- → Antinutritional value

In the form of ;

And
- → Non-fermented seed
- → Fermented seed

Objective

To study the physicochemical properties, nutritional value and antinutritional value of non-fermented and fermented seeds.

Significance

A new source of nutritional value that is cheaper and easily found can be exploited as human used in the form of non-fermented or fermented seeds

Scope

1- To study the physicochemical properties

2- To study the nutritional value

3- To study the antinutritional value

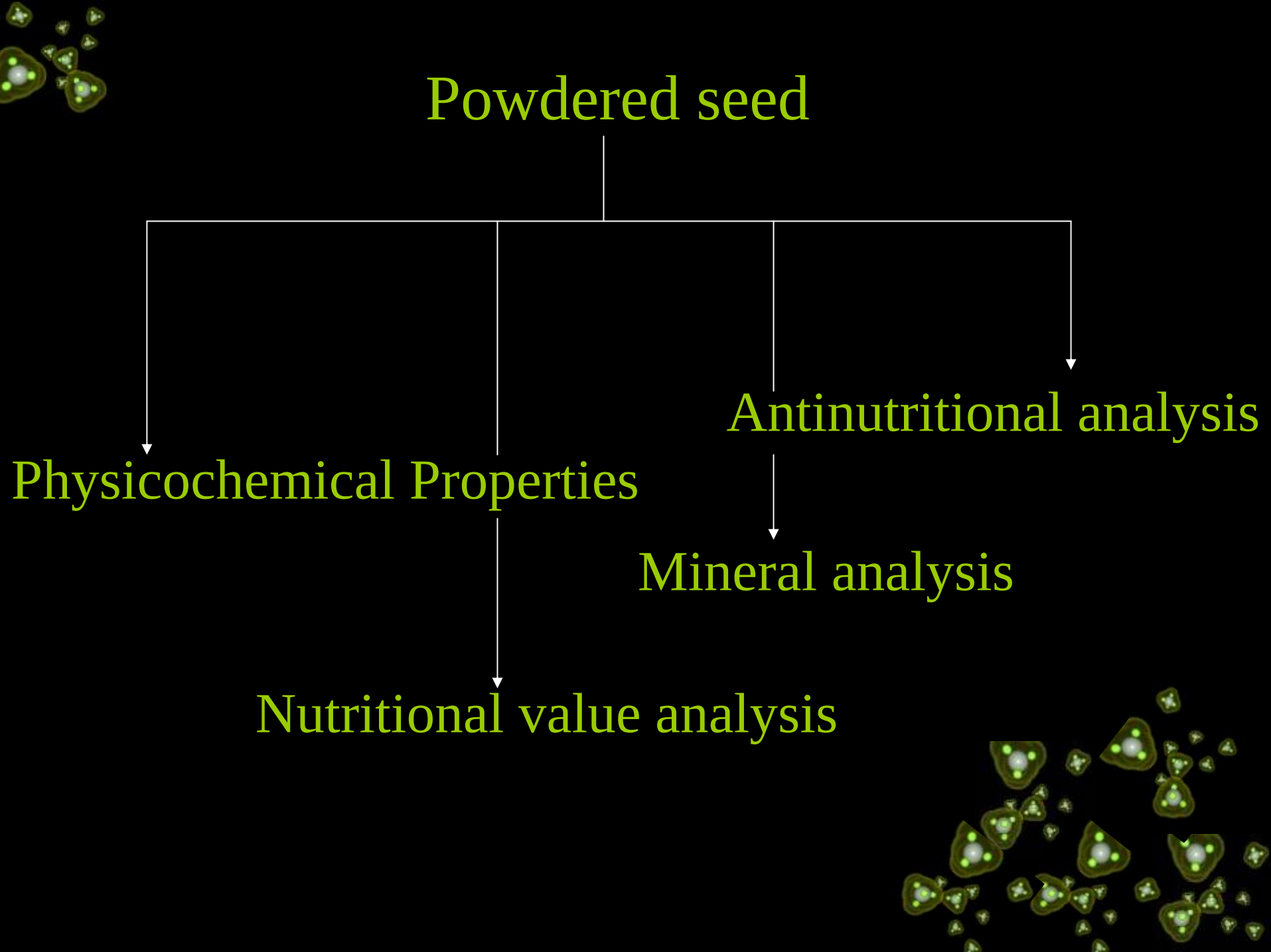
- In non-fermented and fermented seeds

4- To compare which type of seed is better for human consumption

Method

for

Non-fermented and fermented perah seeds


Powdered seed
Physicochemical Properties
Antinutritional analysis
Mineral analysis
Nutritional value analysis

Method

Proximate composition:

- moisture content; Ezeagu *et al*. 2002
- crude protein; Biuret Method
- crude fat; Chopra and Kanwar, 1976
- crude fibre; Chopra and Kanwar, 1976
- ash; Chopra and Kanwar, 1976

Method

Physicochemical Properties:

Based on the characteristics of the seed;

- Texture
- Shape
- Colour
- Smell

Method

Mineral analysis: ICP-MS

- Lead
- Mercury
- Copper
- Zinc
- Arsenic
- Iron
- Magnesium
- Nikel
- Potassium
- Cadmium
- Chromium
- Cobalt
- Calcium,
- Sodium
- Phosphorus
- Selenium
- Aluminium
- Silver

Method

Antinutritional analysis:

- Detect the presence of cyanide
- Using cyanide test; Chopra and Kanwar, 1976

Results and Discussion

Physicochemical properties

Figure 3: Non-fermented perah seed

Figure 4: Fermented perah seed

Proximate Analysis

Table 1
Chemical composition of Perah Seed
Results expressed as g/100g.

Proximate Analysis	Non-fermented Perah Seed	Fermented Perah Seed
Moisture (%)	38.65 ±0.15	5.25±0.15
Ash (%)	4.80±0.73	3.22±0.08
Crude Protein (g)	59.32±3.72	56.80±2.11
Crude Fat (g)	27.59±1.59	30.09±0.92
Crude Fiber (g)	77.88±1.8	10.01±1.01

Mean ± sd of two replicate analyses

Table 2
Comparison of proximate composition in non-fermented and fermented Perah Seed with Soy Bean reported by Popoola et al. 1986.
Results expressed as g/100g.

Proximate Analysis	**Type of seed**			
	Perah Seed		**Soy Bean**	
	Non-fermented	**Fermented**	**Non-fermented**	**Fermented**
Moisture (%)	38.65 ±0.15	5.25±0.15	53.73	40.07
Ash (%)	4.80±0.73	3.22±0.08	5.19	3.36
Crude Protein (g)	59.32±3.72	56.80±2.11	50.09	45.91
Crude Fat (g)	27.59±1.59	30.09±0.92	20.06	33.44
Crude Fiber (g)	77.88±1.8	10.01±1.01	6.40	3.60

Table 3
Comparison of proximate composition in non-fermented Perah Seed with some underutilized seeds.
Results expressed as g/100g.

Proximate analysis	Type of seeds			
	Perah seed	*Xylia Xylocarpa*	*Canavalia gladiata*	*Canavalia ensiformis*
Moisture (%)	38.65 ±0.15	5.16±0.16	11.2±0.04	8.5±0.3
Ash (%)	4.80±0.73	5.11±0.87	3.9±0.01	3.9±0.1
Crude Protein (g)	59.32±3.72	29.53±0.86	26.8±0.24	35.0±0.3
Crude Fat (g)	27.59±1.59	14.78±0.86	2.8±0.01	4.3±0.5
Crude Fiber (g)	77.88±1.8	8.02±1.13	33.1±0.70	7.7±0.3

The data are taken from Eknayake et al. 1998(*Canavalia gladiata*), Siddhuraju et al. 1994 (*Xylia xylocarpa*), and Vadivel & Janardhanan, 2001 (*Canavalia ensiformis*).

Mineral contents analysis

Table 4
Mineral contents in non-fermented and fermented perah seeds

Composition (ppm)	Non-fermented	Fermented
Lead,Pb	0.04	0.01
Mercury,Hg	0.0001	0.0001
Copper, Cu	0.72	0.13
Zinc,Zn	9.35	5.94
Arsenic,As	0.05	0.04
Iron,Fe	9.77	9.80
Magnesium,mg	1.82	1.93
Nikel,Ni	0.14	0.15
Cadmium,Cd	0.004	0.002
Chromium,Cr	0.08	0.08
Cobalt,Co	0.002	0.002
Calcium,Ca	35.07	34.62
Sodium,Na	43.66	22.18
Phosphorus,P	ND (<0.001)	ND (<0.003)
Selenium,Se	-0.02	0.01
Aluminium,AI	0.34	0.30
Silver,Ag	0.0004	0.0004
Barium,Ba	0.04	0.03
Potassium,K	19.08	26.19

(1ppm=1ug/g)

Antinutritional analysis

From the experiment to detect the presence of cyanide;

- on the non-fermented and fermented perah seed

- the results did not show any changes in colour in both seeds, and it means that there is no cyanide trace in both seeds

- it might be due to the amount of seed tested is too little, so that, it hard to detect the presence of cyanide in the seed

Conclusion

1. Perah seed has a good value in order to be a new source of protein since the amount of protein in non-fermented and fermented seeds are high

2. From the results, fermented perah seed has better potential of nutritional value compare to the non-fermented perah seed. This due to the longer of shelf life, the preservation of protein, the decreasing of heavy metal composition, and the high amount of potassium in the fermented seed

3. For the antinutritional factor which is cyanide, the results shows that there is no cyanide traced in boths of the seeds

Recommendation

1. Use fresh sample of perah seed so that the composition analysis is more accurate without any degradation process that might occur in the raw seed

2. Used *Bacillus subtilis* as the starter culture in the fermentation process of raw perah seed in order to increase the nutrient composition of the seed

3. For the antinutritional analysis, since there is several claim that perah seed contains cyanide, for the further study, it is suggested that the different method for cyanide test is used

References

•Achi O. K., (2005). Tradisional fermented protein condiments in Nigeria. African Journal of Biotechnology. Vol 4 (13), pp. 1612-1621.

•Chopra S. L., Kanwar J. S., (1976). Analytical Agricultural Chemistry, Third Edition12, 332-341.

•Popoola T. O. S., Akueshi C. O., (1986). Nutritional evaluation of Daddawa, a local spice made from soybean (Glycine max). MIRCEN Journal, 1986, 2, 405-409

•Siddhuraju P., Vijayakumari K. and Janardhanan K., (1994). Nutrient and chemicalEvaluation of raw seeds of Xylia Xylocarpa: an underutilized food source. Food Chemistry, 53, 299-304

•Vadivel V., Janardhanan K., (2001). Diversity in nutritional composition if wild jack Bean (*Canavalia ensiformis L. DC*) seeds collected from south India. Food Chemistry, 74, 507-511

THANK YOU

Physicochemical properties

Table 1
Characteristics of Fermented and Non-fermented Perah Seed

Properties	Type	
	Non-fermented perah seed	Fermented perah seed
Texture	Less cohesive	Cohesive
Shape	Not shrinkage	Shrinkage
Colour	Dark brown	Light brown
Smell	Strong smell	Pleasant smell

Traditional fermentation

From Achi O. K. , 2005;

- In the traditional method of manufacture, the fermentation of the legume seeds achieved by indigenous microflora of the addition of fermented material.

- It may be assumed that undefined starter cultures have traditionally been employed in the manufacture of these products.

Table 4.6
Tolerable Upper Intake Levels for Iron for Infants 7 to 12 months, Children, and Adults

Age	Males (mg/day)	Females (mg/day)	Pregnancy (mg/day)	Lactation (mg/day)
7 to 12 months	40	40	N/A	N/A
1 to 13 years	40	40	N/A	N/A
14 to 18 years	45	45	45	45
19 + years	45	45	45	45

Information from National Institute of Health

From Table 4.2;

Reported in Enujiugha V. N., 2003,

- the amount of protein content should increased after the fermentation process because fermenting microorganism such as *Bacillus*, that was used to ferment the seeds will produce extracellular enzyme which contain amino acid

- crude fiber content decreased probably due to the inability of the microbial agents to synthesize cellulases and hemicellulases for the hydrolyses of complex polysaccharides in the seed

- From the results, fermented perah seed is better in term of preservation of protein and the shelf life

Background of Tapos

Habitat and ecology

- In hilly primary and secondary forest
- Soil usually deep and yellow coloured
- Flowering and fruiting throughout the year
- Altitude from sea level up to 600 m

Tapos is a new discovery of seeds and the information on its nutritional value and antinutritional value is very lack.

OUTLINE

Background of Tapos
Problem Statement
Objective
Significance
Scope
Method
Results and Discussion
Conclusion and Recommendation
References